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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,096	11/18/2003	Michal Danek	761C4/CPI/L/B/PJS	4854

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EXAMINER	
LUND, JEFFRIE ROBERT	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/716,096	DANEK ET AL.	
	Examiner	Art Unit	
	Jeffrie R. Lund	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. In reviewing the new claims 23 and 24, the Examiner has determined that the current claims have a priority date of February 28, 1997 and are based on the information added in the parent application 08/808,246. This has no effect on the rejections of record and is noted to clarify the record.

2. The Examiner further notes that office records indicate that the dependency for the present application is: Application No. 10/716,096, filed Nov. 18, 2003 is a continuation of Application No. 08/808,246, filed on Feb. 27, 1997 now US Patent 6,699,530; which is a continuation-in-part of Application No. 08/680913, filed July 12, 1996, now abandoned; which is a continuation-in-part of Application No. 08/49890, filed Jul. 6, 1995, now abandoned; which is a continuation-in-part of Application No. 08/339521, filed Nov. 14, 1994, now abandoned. This is different than the applicant's claimed priority. The Examiner request that the Applicant clarify the Applicant's priority claim.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1-22 rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,155,198 ('198). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed structure of the present invention is the same as the structure taught by the claims in '198, and differ only in minor obvious ways such as the gas supplied or layer deposited.

5. Claims 23 and 24 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of U.S. Patent No. 6,155,198 ('198) in view of Davies et al, US Patent 4,313,783.

'198 differs from the present invention in that '198 does not teach a control unit coupled to at least the process chamber.

Davies et al teaches a processing apparatus that includes a computer 46 which is programmed in accordance with how the wafers are to be processed and is coupled to the processing chamber (Figure 1, column 2 line 66 through column 3 line 20)

The motivation for adding the controller of Davies et al to the apparatus of '198 is to provide a required but not disclosed controller that will enable the control and operation of the processing apparatus of '198.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the controller of Davies et al to the apparatus of '198.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-8, 10-16, and 18-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Pang et al, US Patent 5,017,403.

Pang et al teaches a plasma processing apparatus that includes: a process chamber 10; a shower head 29; a gas source 22 that includes H2, N2, and HMDS (a metallo-organic source; a wafer support 18; a heater 26; a first RF source 14 coupled to the showerhead; and a second RF source 15 coupled to the wafer support. (Figure 1) The particular type of gas used (TDMAT), ratio of gases, the temperature of the support, and material deposited are process limitations rather than apparatus limitations, and the recitation of a particular type of process limitations do not limit an apparatus claim, see *In re Casey*, 152 USPQ 235; *In re Rishoi*, 94 USPQ 71; *In re Young*, 25 USPQ 69; *In re Dulberg*, 129 USPQ 348; *Ex parte Thibault*, 164 USPQ 666; and *Ex parte Masham*, 2 USPQ2d 1647. Furthermore, it has been held that: claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is,

not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus "if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114

This rejection is based on the fact that the apparatus structure taught by Pang et al has the inherent capability of being used in the manner intended by the Applicant.

8. Claims 1-6 and 10-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Sakamoto et al, US Patent 5,698,062.

Sakamoto et al teaches a plasma processing apparatus that includes: a process chamber 2; a shower head 21; a gas source 25; a wafer support 11; a heater 5; at least one RF source 142 coupled to the showerhead and to the wafer support; and a phase controller to supply the RF energy 180° out of phase (column 10 lines 46-53). (Figure 1) The particular type of gas used, ratio of gases, and the temperature of the support are process limitations of a specific process rather than apparatus limitations, and the recitation of a particular process and its associated limitations do not limit an apparatus claim, see *In re Casey*, 152 USPQ 235; *In re Rishoi*, 94 USPQ 71; *In re Young*, 25 USPQ 69; *In re Dulberg*, 129 USPQ 348; *Ex parte Thibault*, 164 USPQ 666; and *Ex parte Masham*, 2 USPQ2d 1647. Furthermore, it has been held that: claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover

what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus " if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114

This rejection is based on the fact that the apparatus structure taught by Sakamoto et al has the inherent capability performing the specific process intended by the Applicant.

9. Claims 1-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Tomoyasu et al, US Patent 5,900,103.

Tomoyasu et al teaches a plasma processing apparatus that includes: a process chamber 2; a shower head 21; a gas source 35, 36, 37 that includes N_2, H_2, and tetrakis(dimethylamido) titanium; a wafer support 11; a heater 5; a first RF source 61 coupled to the showerhead; a second RF source 51 coupled to the wafer support; a phase controller 52 that supplies RF energy 180° out of phase (column 10 lines16-23); and a process controller 758. (Entire document) The ratio of gases, and the temperature of the support are process limitations rather than apparatus limitations, and the recitation of a particular type of process limitations do not limit an apparatus claim, see *In re Casey*, 152 USPQ 235; *In re Rishoi*, 94 USPQ 71; *In re Young*, 25 USPQ 69; *In re Dulberg*, 129 USPQ 348; *Ex parte Thibault*, 164 USPQ 666; and *Ex parte Masham*, 2 USPQ2d 1647. Furthermore, it has been held that: claims directed to

apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danley*, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus " if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114

This rejection is based on the fact that the apparatus structure taught by Tomoyasu et al has the inherent capability of being used in the manner intended by the Applicant.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pang et al, US Patent 5,017,403 in view of Tomoyasu et al, US Patent 5,900,103.

Pang et al was discussed above.

Pang et al differs from the present invention in that Pang et al does not teach supplying the RF energy 180° out of phase.

Tomoyasu et al was discussed above and includes a phase controller 52 for controlling the phase difference of the RF energy and specifically teaches supplying the RF energy 180° out of phase.

The motivation for adding a phase controller to the apparatus of Pang et al as taught by Tomoyasu et al is to control the phase of the energy supplied to the support.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add the phase controller of Tomoyasu et al to the apparatus of Pang et al.

12. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomoyasu et al, US Patent 5,900,103 in view of Davies et al, US Patent 4,313,783, and Sandhu, US Patent 5,576,071.

Tomoyasu et al was discussed above.

Tomoyasu et al differs from the present invention in that Tomoyasu et al does not teach a control unit coupled to at least the process chamber, the control unit containing instructions which, when executed, cause the apparatus to form a metal nitride film from the deposition gas mixture (metallo-organic gas, specifically TDMAT, and N_2) within the process chamber and to plasma anneal the metal nitride film using the annealing gas within the process chamber.

Davies et al teaches a processing apparatus that includes a computer 46 which is programmed in accordance with how the wafers are to be processed and is coupled to the processing chamber (Figure 1, column 2 line 66 through column 3 line 20)

Sandhu teaches a SiN deposition method that includes reacting tetrakis(dimethylamido) titanium and N_2 to form a TiN layer (column 3 lines 55-66) and then treating the TiN layer by exposing it to a hydrogen plasma (plasma anneal) to remove carbon (column 4 lines 9-60).

The motivation for replacing the generic controller of Tomoyasu et al with the controller of Davies et al is to supply the apparatus of Tomoyasu et al with a specific controller and enable the apparatus of Tomoyasu et al to perform any process programmed into the controller.

The motivation for adding the TiN deposition and plasma annealing process of Sandhu in the form of a program to the apparatus of Tomoyasu et al and Davies et al is to enable the apparatus of Tomoyasu et al and Davies et al to deposit a TiN layer and the plasma anneal the TiN layer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the generic controller of Tomoyasu et al with the programmable controller of Davies et al and to then program the TiN deposition and annealing process of Sandhu into the controller.

Response to Arguments

13. Applicant's arguments filed December 21, 2004 have been fully considered but they are not persuasive.

In regard to the argument that the present amendment renders the obvious double patenting rejection moot, the Examiner disagrees. Danek et al teaches a

metallo-organic precursor gas source in claim 1 and tetrakis(dimethylamido) titanium (TDMAT) in claim 10.

In regard to the argument that Pang et al does not teach supplying a metallo-organic precursor, the Examiner disagrees. Pang et al teaches supplying HMDS, which is a metallo-organic. If Pang et al did not teach a metallo-organic, as discussed above, the specific type of gas supplied is an intended use of the apparatus, and the apparatus of Pang et al is inherently capable of supplying the desired gas.

In regard to the argument that Pang et al does not teach supplying TDMAT and N_2, the Examiner disagrees. Pang et al teaches supplying N_2. As discussed above, the specific type of gas (i.e. TDMAT) supplied is an intended use of the apparatus, and the apparatus of Pang et al is inherently capable of supplying the desired gas.

In regard to the argument that Sakamoto et al does not teach supplying a metallo-organic precursor, the Examiner agrees but notes that the specific type of gas supplied (i.e. a metallo-organic precursor) is an intended use of the apparatus, and the apparatus of Sakamoto et al is inherently capable of supplying the desired gas.

In regard to the argument that Tomoyasu et al does not teach supplying TDMAT and N_2, the Examiner disagrees. Tomoyasu et al teaches supplying metallo-organics including TDMAT (column 18 lines 48-59) and N_2 (column 5 line 7).

The argument directed to claims 9 and 17 is based on the arguments directed to Pang et al and Tomoyasu et al and have been addressed above.

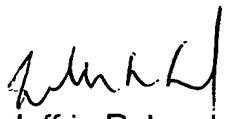
Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art teaches the technological background of the invention. This art also includes references that teach TiN deposition using TDMAT, plasma annealing, and programmable controllers that could be used in rejections.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
3/1/05